Serial No. 08/703,177 filed August 23, 1996, now abandoned, which is a continuation of U.S. Application Serial No. 08/327,927 filed October 24, 1994, now U.S. Patent No. 5,559,720, which is a continuation of U.S. Patent Application Serial No. 08/225,282 filed January 11, 1994, now U.S. Patent No. 5,361,215, which is a continuation of U.S. Patent Application Serial No. 07/224,869 filed July 26, 1988, now abandoned, which is a continuation-in-part of U.S. Patent Application Serial No. 07/054,581, filed May 27, 1987, now abandoned, each of the above related applications and patents being incorporated herein by reference.

IN THE CLAIMS

Please cancel claims 1-34 and add new claims 35-72.

35. (new) A control system for a water spa adapted to remain substantially continuously filled with water between uses and capable of outside use, comprising:

an electrical power source for providing energy to the spa;

a system interconnection panel in electrical communication with the power source, the system interconnection panel including a microprocessor and a step-down power supply for providing energy to the microprocessor;

an electric resistive heating element for heating the water, the heating element in electrical communication with the interconnection panel;

a first electronic solid state temperature sensor for detecting the temperature of the water in the spa; and

a second electronic solid state temperature sensor for detecting the temperature of the water proximate the heating element.

36. (new) The control system of claim 35, wherein the first and second temperature sensors are in electrical communication with the interconnection panel.

37. (new) The control system of claim 35, further comprising a control panel capable of displaying alphanumeric characters.

38. (new) The control system of claim 37, wherein the control panel is in electrical communication with the interconnection panel.

39. (new) The control system of claim 36, wherein the microprocessor is adapted to generate a signal capable of turning the heating element on or off.

40. (new) The control system of claim 38, wherein the microprocessor is adapted to generate a signal to control the alphanumeric characters displayed on the control panel.

41. (new) The control system of claim 39, wherein the water flows past the heating element, the first temperature sensor detects the water upstream of the heating element, and the second senor detects the temperature of the water downstream of the heating element.

42. (new) The control system of claim 41, wherein the microcomputer is adapted to receive a signal from the first temperature sensor that is indicative of the temperature of the water at the location of the first temperature sensor and a signal from the second temperature sensor that is indicative of the temperature of the water at the location of the second temperature sensor, and to calculate the difference between the temperature at the first sensor and the temperature at the second sensor.

43. (new) The control system of claim 42, wherein the microprocessor is adapted to generate a signal capable of turning the heating element off when the difference between the temperature at the first sensor and the temperature at the second sensor exceeds a predetermined amount.

44. (new) The control system of claim 35, wherein the step-down power supply is adapted to convert energy supplied by the power source into a lower power and a lower voltage as required by one or more electronic components connected thereto.

45. (new) The control system of claim 35, wherein a ground fault circuit interrupter is electrically interposed between the electrical power source and the system interconnection panel.

46. (new) The control system of claim 35, further comprising a pump, wherein the pump is in electrical communication with the interconnection panel.

47. (new) The control system of claim 35, further comprising converter circuitry associated with the microprocessor capable of converting analog input to digital information.

48. (new) The control system of claim 47, further comprising means for converting the digital information to engineering units.

49. (new) The control system of claim 48, further comprising a control panel capable of displaying alphanumeric characters, and a display interface capable of causing the engineering units to be displayed on the control panel.

50. (new) The control system of claim 35, further comprising an additional sensor.

51. (new) The control system of claim 50, wherein the additional sensor is adapted to produce a signal indicative of the presence or the absence of water flow.

52. (new) The control system of claim 50, wherein the additional sensor is adapted to produce a signal indicative of the presence or the absence of water.

53. (new) The control system of claim 48, wherein the means for converting includes a curve fitting algorithm.

54. (new) A water spa for bathing, comprising:

an open container adapted to remain substantially continuously filled with water between uses, wherein the container is also adapted for outside use;

an electrical power source for providing energy;

a system interconnection panel in electrical communication with the power source, the system interconnection panel including a microprocessor and a step-down power supply for providing energy to the microprocessor;

an electric resistive heating element for heating the water, the heating element in electrical communication with the interconnection panel;

a first electronic solid state temperature sensor for detecting the temperature of the water in the container; and

a second electronic solid state temperature sensor for detecting the temperature of the water proximate the heating element.

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55. (new) The spa of claim 54, wherein the first and second temperature sensors are in electrical communication with the interconnection panel.

56. (new) The spa of claim 54, further comprising a control panel capable of displaying alphanumeric characters.

57. (new) The spa of claim 56, wherein the control panel is in electrical communication with the interconnection panel.

58. (new) The spa of claim 55, wherein the microprocessor is adapted to generate a signal capable of turning the heating element on or off.

59. (new) The spa of claim 57, wherein the microprocessor is adapted to generate a signal to control the alphanumeric characters displayed on the control panel.

60. (new) The spa of claim 58, wherein the water flows past the heating element, the first temperature sensors detects the water upstream of the heating element, and the second sensor detects the temperature of the water downstream of the heating element.

61. (new) The spa of claim 60, wherein the microcomputer is adapted to receive a signal from the first temperature sensor that is indicative of the temperature of the water at the

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location of the first temperature sensor and a signal from the second temperature sensor that is indicative of the temperature of the water at the location of the second temperature sensor, and to calculate the difference between the temperature at the first sensor and the temperature at the second sensor.

62. (new) The spa of claim 61, wherein the microprocessor is adapted to generate a signal capable of turning the heating element off when the difference between the temperature at the first sensor and the temperature at the second sensor exceeds a predetermined amount.

63. (new) The spa of claim 54, wherein the step-down power supply is adapted to convert energy supplied by the power source into a lower power and a lower voltage as required by one or more electronic components connected thereto.

64. (new) The spa of claim 54, wherein a ground fault circuit interrupter is electrically interposed between the electrical power source and the system interconnection panel.

65. (new) The spa of claim 54, further comprising a pump, wherein the pump is in electrical communication with the interconnection panel.

66. (new) The spa of claim 54, further comprising converter circuitry associated with the microprocessor capable of converting analog input to digital information.

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67. (new) The spa of claim 66, further comprising means for converting the digital information to engineering units.

68. (new) The spa of claim 67, further comprising a control panel capable of displaying alphanumeric characters, and a display interface capable of causing the engineering units to be displayed on the control panel.

69. (new) The spa of claim 54, further comprising an additional sensor.

70. (new) The spa of claim 69, wherein the additional sensor is adapted to produce a signal indicative of the presence or the absence of water flow.

71. (new) The spa of claim 69, wherein the additional sensor is adapted to produce a signal indicative of the presence or the absence of water.

72. (new) The spa of claim 71, wherein the means for converting include a curve fitting algorithm.